BIOACCUMULATION – ECOLOGICAL RISK NARRATIVE

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A comment on bioaccumulation based clean up issues – no real solution to the problem but here it is.

Bulk cleanup of contaminated sediment will be effective at removing the total load of a contaminant in the environment. However, those compounds that are associated with organic carbon (non-polar organics) are available for uptake based on the organic carbon normalized value and as such removal without an adjustment to that ratio results in little change in the tissues of the exposed organisms. Changes in the TOC normalized value can occur naturally with the natural deposition of clean organic carbon to the sediment but this also seems to require movement of the contaminant from the contaminated TOC to the clean TOC (a dilution like concept but different than our standard definition). Like the residuals issue, contaminated sediment left behind (low density, higher TOC normalized concentrations) retains the problem – especially when effectiveness is defined by decreasing body burdens of organisms living at these locations. There are some projects where bioaccumulation has gone down after removal actions but there are others where the residuals that remain behind after removal maintain the concentrations in the tissues. These elevated tissue values may even equal or in some cases exceed the pre-cleanup levels. Bioaccumulation may be a great sentinel for assessing cleanup but the cleanup activities will have to extend to not only bulk removal but also alterations in the TOC normalized values for those chemical types. Methods in use at some sites include the addition of GAC (granulated activated carbon) and SediMite and in some cases covers with higher TOC concentrations. There are still issues to think about here and setting time lines on bioaccumulation assessments of cleanup effectiveness may be very long periods. In Richmond Harbor the tissue levels of organisms collected at the site equal or exceed those values of DDx that were present prior to the removal action, over 10 years ago. Bulk removal was attained down to the hard packed sediment older bay mud and a sand cap was placed over that z-layer. Residuals and bulk materials under the piers remained and the problem is still there.

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